

REMARKS

The Applicants thank the Examiner for carefully reviewing this application. Please reconsider the application in view of the above amendments and the following remarks.

I. Disposition of claims:

Claims 1-11 were pending in the application. Claim 1 is the only independent claim. Claim 1 has been amended to more clearly define the invention. No new matter has been introduced by these amendments. Claims 3 and 5 have been cancelled.

II. Claim Rejections under 35 U.S.C. §§ 102 and 103:

(a) Claims 1-4, 6-8 and 11 stand rejected as being anticipated by, or in the alternative, obvious over U.S. Patent No. 5,928,990 issued to Guistina et al. ("Guistina"). To the extent that this rejection applies to the amended claims, it is respectfully traversed.

The present invention relates to recording sheets and methods for making the same. As shown in Figures 1a-1c, in one embodiment, a recording sheet 10 according to the invention includes a transparent substrate 11, an ink receptive layer 12 formed on the surface of the substrate 11, and an ink permeable layer 13 formed on the surface of the ink receptive layer 12. (Specification, p. 8, line 16 – p. 10, line 8; Figs. 1a-1c). With recording sheets of the invention, ink is applied on the surface of the ink permeable layer 13, not the ink receptive layer 12. The applied ink then travels through the ink permeable layer 13 to the ink receptive layer 12.

In some embodiments, the ink permeable layer 13 comprises a nonionic surfactant and a water-insoluble component. The water-insoluble component may comprise an inorganic filler and a binder. (Specification, p. 5, lines 18-25). The inorganic filler may be made of silica

and the binder may include a polyester resin as a main component by weight. (Specification, p. 6, lines 1-9).

Advantageously, an ink permeable layer in accordance with the invention prevents ink from dispersing laterally in the ink permeable layer. As a result, there will be no smear in a printed image. (Specification, p. 22, lines 6-14). Consequently, a recording sheet of the present invention provides an improved print density and transparent image banding. (Specification, p. 12, Table 1). In addition, a dot printed on a recording sheet of the present invention has a smaller diameter and has a more consistent appearance when viewed from the front or back of a transparent sheet, as compared to a dot printed on a conventional recording sheet. (Figs. 2-4).

Claim 1 of the present invention recites a recording sheet comprising a substrate; an ink receptive layer placed on the substrate for retaining ink; and an ink permeable layer placed on a surface of the ink receptive layer, through which the ink permeates to the ink receptive layer, the ink permeable layer comprising a nonionic surfactant made of an amine compound and a water-insoluble component including an inorganic filler made of silica and a binder.

In contrast, Guistina discloses a dye receiving layer of Guistina prepared from an aqueous coating composition comprising a polyester and hydrated transition metal or metalloid salt of a strong acid. (Col. 7, lines 27-30). The hydrated transition metal or metalloid salt of a strong acid provides protons that protonate the cationic thermal transfer dye after the dye is transferred to the receiving layer. The Examiner indicated that the hydrated transition metals or metalloid salts of a strong acid read on "inorganic fillers," generally. Claim 1, however, no recites that the inorganic filler is silica. Guistina fails to disclose such an inorganic filler, so that the withdrawal of the §102 rejection of Guistina is respectfully requested.

Moreover, the Applicant notes that the inorganic filler of Guistina cannot be used to transmit a water-based ink because the dye image-receiving medium of Guistina is used for a thermal dye transfer and the inorganic filler of Guistina is preferable to be fixed to the dye. Thus, the thermal dye printing sheets disclosed by Guistina are very different from the recording sheets of the present invention. First, thermal inks are hydrophobic, whereas the recording sheets of the present invention are for water-based inks.

Moreover, even if the dye image-receiving medium of Guistina were capable of being printed with a water-based ink, the hydrated transition metals or metalloid salts of a strong acid would be hydrolyzed so that the recording sheet would be deteriorated. As a result, the dye image-receiving medium of Guistina cannot be used for ink jet printing.

Furthermore, silica cannot be used alternated to hydrated transition metals or metalloid salts of a strong acid in the medium of Guistina because hydrated transition metals or metalloid salts of a strong acid of Guistina are required in order to protonate the dye.

In addition, in the present invention, the gaps between the adjacent filler particles (*i.e.*, gaps in the silica) allow the formation of a porous structure in the ink permeable layer and the ink permeates from the surface to the inside by passing through holes in the porous structure. (See page 2, line 16 to page 3, line 2 of the specification).

Therefore, the hydrated transition metals or metalloid salts of a strong acid disclosed by Guistina are different from the inorganic filler (silica) claimed in the present invention.

Because Guistina does not teach or suggest the limitations recited in claim 1, it cannot anticipate or render obvious the invention as recited in claim 1. The dependent claims are

therefore patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

(b) Claims 1, 2 and 5-11 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,919,559 issued to Nakano et al. ("Nakano"). To the extent that this rejection applies to the amended claims, it is respectfully traversed.

Nakano discloses a recording sheet comprising a substrate sheet and an ink-absorbing layer, provided on at least one face of the substrate sheet. The ink-absorbing layer contains a water soluble resin or water dispersible resin and an ester group-possessing nonionic surfactant. (Abstract). The substrate is used as a support for the ink-absorbing layer. (Col. 2, lines 12-13). An intermediate layer comprising the water soluble resin or water dispersible resin and a polyhydric alcohol may be provided between the substrate sheet and the ink-absorbing layer. "The intermediate layer provides primarily an effect as an adhesive layer for the substrate and the ink-absorbing layer." (Col. 8, lines 30-38).

In contrast to the present claims, however, Nakano discloses using starch or casein as a binder. *See* Col. 2, ll. 48-51. As such, the binder of Nakano is obviously hydrophilic, whereas the binder used for the ink-permeable layer in the present invention is water insoluble. Nakano fails to show or suggest such a limitation. In addition, claim 1 has been amended to include the limitation that the nonionic surfactant is an amine compound. Claim 3 was found not to be obvious over Nakano and, therefore, amended claim 1 cannot be obvious over Nakano.

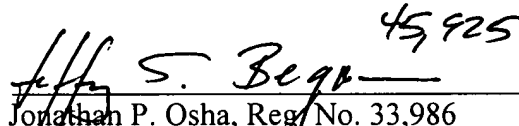
Because Nakano fails to teach or suggest the limitations as recited in claim 1, it cannot render claim 1 obvious. The dependent claims, therefore, are patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Conclusion

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 03310.017001).

Respectfully submitted,

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Jonathan P. Osha, Reg. No. 33,986
ROSENTHAL & OSHA L.L.P.
1221 McKinney Street, Suite 2800
Houston, Texas 77010
Telephone: (713) 228-8600
Facsimile: (713) 228-8778

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